Comparative study of ZnSe powders synthesized by two different methods and sintered by Hot-Pressing

Gang Zhou [1], Laurent Calvez [1], Gallue Delaizir [2], XiangHua Zhang [1],

Jean Rocherullé [1]

1 *Equipe Verres et Céramiques, UMR-CNRS 6226 Institut des Sciences Chimiques, Université de Rennes – France*

2 *Université de Limoges – France*

E-mail : gang.zhou@univ-rennes1.fr

ZnSe is an important infrared optical material. It's popularly used as optical components in infrared field such as high-power CO_2 laser and thermal imagining. At present, polycrystalline ZnSe has been mainly produced by chemical vapor deposition (CVD) method which leads to the high price of ZnSe. We expect to find a relative cheap and simple way to prepare ZnSe ceramic.

In this work, ZnSe powders have been synthesized using two different methods: hydrothermal route and high energy ball milling. The obtained powders have been dispersed and separated through the ultrasonic process. A comparison has been made between the powders by means of X-Ray powder Diffraction (XRD) and Scanning Electron Microscopy (SEM). The as-prepared ZnSe powders and the fine powders obtained after ultrasonic separation have been sintered by conventional uniaxial Hot-Pressing (HP) technique in order to prepare ZnSe bulk ceramics respectively. The optical properties of the ceramics sintering with different powders have been characterized and compared. As a result, the sintering of the fine hydrothermal powder presents the best transparency in the visible and infrared range. The transmission exceeds 60% in the range from 11 to 19 µm.